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09/964,781	09/28/2001	Nobuhiro Yasui	35.C15831	3026

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EXAMINER

KOPPIKAR, VIVEK D

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 03/14/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/964,781

Applicant(s)

YASUI ET AL.

Examiner

Vivek D Koppikar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 September 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) 37-43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15-25 and 27-35 is/are rejected.
- 7) ☒ Claim(s) 14, 26, and 36 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/28/01 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 and 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-36, drawn to a magnetic recording medium, classified in class 428, subclass 692.
  - II. Claims 37-43, drawn to a method of manufacturing a magnetic recording medium, classified in class 360, subclass 126.
2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the magnetic recording medium could be made by a process which uses sputtering or dip coating to deposit the hard magnetic substance layer on the substrate.
3. During a telephone conversation with Peter Saxon on February 5, 2003 a provisional election was made with traverse to prosecute the invention of I, claims 1-36. Affirmation of this election must be made by applicant in replying to this Office action. Claims 37-43 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.
4. Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

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5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Claim Objections***

6. Claims 14, 26 and 36 appear to be method claims of using the magnetic recording medium of claims 1, 15, and 27, respectively, however there are no process steps. Therefore the claims are incomplete. The examiner suggests changing the word "using" in these claims to "comprising."

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1,020,545 to Iwasaki et al. in view of WO 99/24973 to Lambeth et al.

With regard to Claims 1-2 and 6, Iwasaki teaches an aluminum oxide layer (13) with holes (14) which is applied over a substrate (11). The aluminum oxide layer (13) is used in magnetic recording media (Col. 2, Ln. 33-35 and Col. 4, Ln. 31-40). In one embodiment of the invention, there is a conductive layer (18), composed of metal, in between the aluminum oxide layer (13) and the substrate (11) (Col. 13, Ln. 2-6 and Ln. 19-21, and Figure 5A). The

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aluminum oxide layer has pores (14) present which come in contact with the conductive layer (18) (Figure 5B). The pores are filled with a metallic filler (Col. 6, Ln. 48-54, Col. 12, Ln. 55-Col. 13, Ln. 6 and Figure 5A).

Iwasaki does not teach that the conductive layer (18) has an fcc structure, with its (111) face oriented in a direction perpendicular to the substrate nor that the metallic substance which fills the pores has an hcp structure in which the c-axes are oriented in a direction perpendicular to the substrate.

Lambeth teaches a highly oriented magnetic thin film and recording media. The recording media includes an underlayer (14) is disposed between the substrate (12) and the magnetic recording layer (16). This layer (14) is a conductive layer which has an fcc structure and a (111) crystal texture. The face of this layer (14) is oriented in a direction perpendicular to the substrate (Page 17, Ln. 4-16). Since these layers are made of either Ag and Cr they are conductive. Lambeth teaches Co alloys which have an hcp structure along the c-axis and in which the c-axis is perpendicular to the plane of the substrate. These Co alloys exhibit high coercivity in magnetic media (Page 9, Ln. 8-15 and Page 12, Line 14-16).

At the time of the invention one of ordinary skill in the art would have been motivated to make the conductive layer in Iwasaki of an fcc structure and use a Co alloy with an hcp orientation as the metallic filler with the expectation of obtaining a magnetic recording medium with enhanced storage capacity, lower noise and higher coercivity as recited in Lambeth (Page 1, Ln. 23-32).

With regard to Claim 3, the holes in the aluminum oxide layer of Iwasaki are produced from anodic oxidation (Col. 2, 2-7).

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With regard to Claim 4, the base electrode layer (18) in Iwasaki is an electrode (Col. 13, Ln. 2-6).

With regard to Claim 5, Iwasaki teaches that the conductive layer is made from a metal (Col. 13, Ln. 7-10). The examiner takes the position that this includes copper.

With regard to Claims 7-9, in one embodiment of Lambeth the portion of the magnetic recording substance that touches the conductive layer is made of either copper or NiFe (Page 17, Ln. 28-Page 18, Ln. 7). Adding these metals to a cobalt alloy results in a magnetic recording with lower noise. Therefore at the time of the invention one of ordinary skill in the art would have been motivated to use one of these cobalt alloys as the metallic filler in Iwasaki with the expectation of obtaining a magnetic recording medium with reduced noise.

With regard to Claim 10, Lambeth teaches that the magnetic layers and the intermediate layers (conductive layers) of the recording medium are given epitaxial growth so that the grain sizes can be controlled (Page 12, Ln. 4-10). Therefore at the time of the invention one of ordinary skill in the art would have been motivated to make the conductive and magnetic layers in Iwasaki epitaxial growth layers with the expectation of having more control over the grain size of the magnetic recording medium.

With regard to Claim 11, Lambeth teaches applying a soft magnetic layer under the conductive layers in order to reduce noise (Page 17, Ln. 28-35). Therefore at the time of the invention one of ordinary skill in the art would have added a soft magnetic layer under the conductive layer in Iwasaki with the expectation of reducing noise in the magnetic recording medium.

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With regard to Claims 12 and 13, Iwasaki teaches that the holes in the aluminum oxide layer can be arranged in either a honeycomb or rectangular array (Col. 2, Ln. 1-5, and Col. 10, Ln. 43-49).

9. Claims 15-25 and 27-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1,020,545 to Iwasaki in view of WO 99/24973 to Lambeth and US Patent Number 5,363,794 to Lairson.

With regard to Claim 15, Iwasaki teaches an aluminum oxide layer (13) with holes (14) which is applied over the substrate (11). The aluminum oxide layer (13) is used in magnetic recording media (Col. 2, Ln. 33-55 and Col. 4, Ln. 31-40). In one embodiment of the invention, there is a conductive layer (18), composed of metal, in between the aluminum oxide layer (13) and the substrate (11) (Col. 13, Ln. 2-6 and Ln. 19-21, and Figure 5A). The aluminum oxide layer has pores (14) present which come in contact with the conductive layer (18) (Figure 5B). The pores are filled with a metallic filler (Col. 6, Ln. 48-54, Col. 12, Ln. 55-Col. 13, Ln. 6 and Figure 5A).

*may not be magnetic ?*

Iwasaki does not teach that the conductive layer has an fcc structure nor that the magnetic substance which fills the pores has an  $Ll_0$  structure in which the c-axes are oriented in a direction perpendicular to the substrate.

Lambeth teaches a highly oriented magnetic thin film and recording media. The recording media includes a layer (14) which is disposed between the substrate (12) and the magnetic recording layer (16). This layer has an fcc structure and its (001) face is oriented in a direction perpendicular to the substrate (Page 16, Ln. 24-27). In one embodiment of Lambeth the magnetic layers are composed of a CoPt alloy (Page 58, Line 32) which has an  $Ll_0$  as

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evidenced by Lairson (Col. 3, Ln. 19-21). In Lambeth the Co alloys have a c-axis which is perpendicular to the plane of the substrate (Page 12, Ln. 14-16).

At the time of the invention one of ordinary skill in the art would have been motivated to make the conductive layer in Iwasaki of an fcc (001) structure and make the metallic substance of a CoPt alloy composition with an  $Ll_0$  orientation with the expectation of obtaining a magnetic recording medium with enhanced storage capacity and lower noise as recited in Lambeth (Page 1, Ln. 23-32).

With regard to Claims 16 and 20-21, in one embodiment the magnetic layer consists of a cobalt alloy, specifically, CoPt or CoCrPt (Page 58, Ln. 30-35). These layers are given epitaxial growth (Page 12, Ln. 25-29).

With regard to Claim 17, in one embodiment the conductive layer (underlayer) is made of copper (Cu) (Page 58, Ln. 1-4).

With regard to Claims 18-19, the magnetic media in Lambeth is made of an fcc structure and its (001) face is oriented in a direction perpendicular to the substrate (Page 16, Ln. 21-Page 17, Ln. 16). The magnetic layer is made from Co or one of its alloys, one of which can be CoPt (Page 58, Ln. 30-32).

With regard to Claim 22, in one embodiment Lambeth teaches than a MgO (111) layer is applied under one of the underlayers (conductive layers) in order to increase the orientational properties of the medium (Page 16, Ln. 1-5 and 30-35). At the time of the invention one of ordinary skill in the art would have added an MgO (111) layer under the conductive layer (18) in Iwasaki with the expectation of increasing the orientational properties of the magnetic medium as recited in Lambeth.



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With regard to Claim 23, Lambeth teaches applying a soft magnetic layer under the conductive layers in order to reduce noise (Page 17, Ln. 28-35). Therefore at the time of the invention one of ordinary skill in the art would have added a soft magnetic layer under the conductive layer in Iwasaki with the expectation of reducing noise in the magnetic recording medium.

With regard to Claims 24 and 25, Iwasaki teaches that the holes in the aluminum oxide layer can be arranged in either a honeycomb or rectangular array (Col. 2, Ln. 1-5, and Col. 10, Ln. 43-49).

With regard to Claim 27, Iwasaki teaches an aluminum oxide layer (13) with holes (14) which is applied over a substrate (11). The aluminum oxide layer (13) is used in magnetic recording media (Col. 2, Ln. 33-55 and Col. 4, Ln. 31-40). In one embodiment of the invention, there is a conductive layer (18), composed of metal, in between the aluminum oxide layer (13) and the substrate (11) (Col. 13, Ln. 2-6 and Ln. 19-21, and Figure 5A). The aluminum oxide layer has pores (14) present which come in contact with the conductive layer (18) (Figure 5B). The pores are filled with a metallic filler (Col. 6, Ln. 48-54, Col. 12, Ln. 55-Col. 13, Ln. 6 and Figure 5A).

Iwasaki does not teach that the conductive layer has an  $Ll_0$ ,  $Ll_1$ ,  $Ll_2$  structure nor that the magnetic substance which fills the pores has an  $Ll_0$  structure in which the c-axes are oriented in a direction perpendicular to the substrate.

Lambeth teaches that underlayers which have  $Ll_0$  or  $Ll_2$  structures. In one embodiment of Lambeth the magnetic layers are composed of a CoPt alloy (Page 58, Line 32) which has an

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Ll<sub>0</sub> as evidenced by Lairson (Col. 3, Ln. 19-21). In Lambeth the Co alloys have a c-axis which is perpendicular to the plane of the substrate (Page 12, Ln. 14-16).

At the time of the invention one of ordinary skill in the art would have been motivated to make the conductive layer in Iwasaki of an Ll<sub>0</sub> or Ll<sub>2</sub> structure and make the metallic substance of a Co alloy composition with an Ll<sub>0</sub> orientation with the expectation of obtaining a magnetic recording medium with enhanced storage capacity and lower noise as recited in Lambeth (Page 1, Ln. 23-32).

With regard to Claims 28-31, in one embodiment the magnetic layer consists of a cobalt alloy, specifically, CoPt or CoCrPt (Page 58, Ln. 30-35). These layers are given epitaxial growth (Page 12, Ln. 25-29).

With regard to Claim 32, in one embodiment Lambeth teaches that a MgO (111) layer is applied under one of the underlayers (conductive layers) in order to increase the orientational properties of the medium (Page 16, Ln. 1-5 and 30-35). At the time of the invention one of ordinary skill in the art would have added an MgO (111) layer under the conductive layer (18) in Iwasaki with the expectation of increasing the orientational properties of the magnetic medium as recited in Lambeth.

With regard to Claim 33, Lambeth teaches applying a soft magnetic layer under the conductive layers in order to reduce noise (Page 17, Ln. 28-35). Therefore at the time of the invention one of ordinary skill in the art would have added a soft magnetic layer under the conductive layer in Iwasaki with the expectation of reducing noise in the magnetic recording medium.

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With regard to Claims 34 and 35, Iwasaki teaches that the holes in the aluminum oxide layer can be arranged in either a honeycomb or rectangular array (Col. 2, Ln. 1-5, and Col. 10, Ln. 43-49).

*Conclusion*


13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Vivek Koppikar** whose telephone number is **(703) 305-6618**. The examiner can normally be reached on Monday-Friday from 8 AM to 5 PM, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones, can be reached at (703) 308-3822. The fax phone numbers for the organization where this application or proceeding are assigned are (703) 305-7718 for regular communications and (703) 305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

  
Vivek Koppikar

2/26/03

  
DEBORAH JONES  
SUPERVISORY PATENT EXAMINER